

CLAIMS:

1. An X-ray source comprising:

- an electron source (1) for the emission of electrons (E),
- a target (4) for the emission of characteristic, substantially monochromatic X-rays (C) in response to the incidence of the electrons (E), said target (4) comprising a metal foil (5) of a thickness of less than 10 μ m and a base arrangement (7, 12) for carrying said metal foil (4), wherein the metal of said metal foil (5) has a high atomic number allowing the generation of X-rays (C) and the material substantially included in the base arrangement (7, 12) has a low atomic number not allowing the generation of X-rays (C), and
- an outcoupling means (11) for outcoupling the X-rays (C) on the side of the metal foil (5) on which the electrons (E) are incident and which is opposite to the side of the base arrangement (7, 12).

2. An X-ray source as claimed in claim 1, wherein said base arrangement comprises a rotatable base plate (12) of a material having an atomic number of less than 10, in particular in the range from 4 to 6.

3. An X-ray source as claimed in claim 1, wherein said base arrangement comprises a cooling circuit (7) arranged to allow a coolant (8) to flow along the side of said metal foil (5) opposite to the side on which the electrons (E) are incident.

4. An X-ray source as claimed in claim 3, wherein the coolant (8) has a mean atomic number of less than 10.

5. An X-ray source as claimed in claim 3, wherein the coolant (8) is water.

6. An X-ray source as claimed in claim 3, wherein said cooling circuit (7) comprises a constriction (10) in the area of the metal foil (5).

7. An X-ray source as claimed in claim 3, wherein said target (4) further comprises a carrier (6) of low atomic number material, in particular having a mean atomic number of less than 10, supporting the metal foil (5) on the side facing the coolant (8).

5 8. An X-ray source as claimed in claim 1, wherein the metal foil (5) has a thickness of less than 5 μ m, preferably between 1 and 3 μ m.

9. An X-ray source as claimed in claim 1, wherein the metal of said metal foil (5) has an atomic number between 40 and 80.

10 10. An X-ray source as claimed in claim 1, wherein said outcoupling means (11) is adapted to outcouple X-rays (C) at angles of an angular range from substantially 45° to 135°, in particular 70° to 110°, to the surface of the metal foil (5).

15 11. An X-ray source as claimed in claim 1, wherein said outcoupling means (11) is adapted to outcouple X-rays (C) in a direction substantially antiparallel to the direction of incidence of said electrons (E), in particular in a direction at an angle in the range from 150° to 210° to the direction of incidence of said electrons (E).

20 12. An X-ray source as claimed in claim 1, wherein said electrons (E) are directed onto the surface of said metal foil (5) at a substantially 90° angle.

25 13. An X-ray source as claimed in claim 1, wherein said electron source (1) is located outside the X-ray beam (C) to be outcoupled, said X-ray source further comprising means (2) for directing the electron beam (E) onto the metal foil (5).

30 14. A target for use in an X-ray source for the generation of characteristic, substantially monochromatic X-rays (C) in response to the incidence of electrons (E), said target (4) comprising a metal foil (5) of a thickness of less than 10 μ m and a base arrangement (7, 12) for carrying said metal foil (5), wherein the metal of said metal foil (5) has a high atomic number allowing the generation of X-rays (C) and the material substantially included in the base arrangement (7, 12) has a low atomic number not allowing the generation of X-rays (C).